AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Original) A distributed Bragg reflector, comprising:

a doped first semiconductor layer including a first binary composition and having a first index of refraction;

a doped second semiconductor layer including a second binary composition and having a second index of refraction that is different than said first index of refraction; and

a first transition region interposed between said first semiconductor layer and said second semiconductor layer, wherein said first transition region includes a plurality of doped first transition semiconductor layers having a plurality of thicknesses and a plurality of doping levels.

2. (Original) A distributed Bragg reflector according to claim 1, further including:

a doped third semiconductor layer including said first binary composition; and

a second transition region interposed between said second semiconductor layer and said third semiconductor layer, said second transition region including a plurality of doped second transition semiconductor layers having a plurality of thicknesses and a plurality of doping levels, wherein said second transition region is different than said first transition region.

3. (Original) A distributed Bragg reflector according to claim 1, wherein said first semiconductor layer includes AlAs.

4. (Original) A distributed Bragg reflector according to claim 3, wherein said second semiconductor layer includes GaAs, and wherein said doped first transition semiconductor layers includes Al, Ga, and As.

5. (Original) A laser, comprising:

a doped substrate;

an active region adjacent said substrate, said active region emitting light at a predetermined wavelength in response to an applied electric current;

a doped first distributed Bragg reflector mirror between said active region and said substrate, said first distributed Bragg reflector mirror reflecting light emitted by said active region back toward said active region;

a doped second distributed Bragg reflector mirror adjacent said active region, said second distributed Bragg reflector mirror reflecting light emitted by said active region back toward said active region;

wherein said second distributed Bragg reflector mirror includes:

a doped first mirror semiconductor layer including a first binary composition and having a first index of refraction;

a doped second mirror semiconductor layer including a second binary composition and having a second index of refraction that is different than said first index of refraction; and

a first transition mirror region between said first mirror semiconductor layer and said second mirror semiconductor layer, said first transition mirror region including a plurality of

doped first transition mirror semiconductor layers having a plurality of thicknesses and a plurality of doping levels.

6. (Original) The laser according to 5, wherein said laser light output is emitted perpendicular to said substrate.

7. (Original) The laser according to 6, further including:

a doped third mirror semiconductor layer including said first binary composition and having said first index of refraction; and

a second transition mirror region between said second mirror semiconductor layer and said third mirror semiconductor layer, said second transition mirror region including a plurality of doped second transition mirror semiconductor layers having a plurality of thicknesses and a plurality of doping levels, wherein said second transition mirror region is different than said first transition mirror region.

8. (Original) The laser according to 7, wherein light emitted by said active region at said predetermined wavelength produces a minimum electric field in said first transition mirror region.

9. (Original) The laser according to 8, wherein said first transition mirror semiconductor layers are doped more heavily than said second transition mirror semiconductor layers.

10. (Original) The laser according to 8, said second transition mirror region is thicker than said first transition mirror region.

11. (Original) The laser according to 7, wherein said first binary composition is AlAs.

12. (Original) The laser according to 11, wherein said second binary composition is GaAs.

13. (Original) The laser according to 12, wherein said first transition mirror semiconductor layers include layers including Al, Ga, and As.

14. (Original) The laser according to 5, wherein said active region includes at least one quantum well.

15. (Original) The laser according to 5, wherein said second distributed Bragg reflector mirror is p-doped.

16. (Original) The laser according to 5, wherein said second distributed Bragg reflector mirror includes an insulating region for confining current inside laser.

17. (Original) The laser according to 5, further including a spacer between said second distributed Bragg reflector mirror and said active region.

18. (Original) The laser according to 5, wherein said first distributed Bragg reflector mirror includes:

an n-doped first bottom mirror semiconductor layer including said first binary composition,

an n-doped second bottom mirror semiconductor layer including said second binary composition; and

a first transition bottom mirror region between said first bottom mirror semiconductor layer and said second bottom mirror semiconductor layer, said first transition bottom mirror region including a plurality of n-doped mirror semiconductor layers having a plurality of thicknesses and a plurality of doping levels.

19. (Currently Amended) A vertical cavity surface emitting laser, comprising:

an n- doped substrate;

an active region adjacent said substrate, said active region emitting light at a predetermined wavelength in response to an applied electric current;

an n-doped bottom distributed Bragg reflector mirror reflecting light emitted by said active region back toward said active region;

a doped top distributed Bragg reflector mirror adjacent said active region, said top distributed Bragg reflector mirror reflecting light emitted by said active region back toward said active region;

wherein said top distributed Bragg reflector mirror includes:

a doped first mirror semiconductor layer including AlAs;

a doped second mirror semiconductor layer including GaAs; and

a first transition mirror region between said first mirror semiconductor layer and said second mirror semiconductor layer, said first transition mirror region including a plurality of

doped $Al_xGa_{1-x}As$ layers having a plurality of thicknesses, a plurality of doping levels, and a plurality of compositions.

20. (Original) The vertical cavity surface emitting laser according to 19, wherein said first transition mirror region has $Al_XGa_{(1-X)}As$ layers that have between 0% and 85% Al composition.

21. (Original) The distributed Bragg reflector according to claim 1, wherein each of said plurality of doped first transition semiconductor layers has different thicknesses and different doping levels from each other.

22. (Previously Presented) The distributed Bragg reflector according to claim 2, wherein each of said plurality of doped second transition semiconductor layers has different thicknesses and different doping levels from each other.

23. (Previously Presented) The laser according to claim 5, wherein each of said plurality of doped first transition semiconductor layers has different thicknesses and different doping levels from each other.

24. (Previously Presented) The laser according to claim 7, wherein each of said plurality of doped second transition semiconductor layers has different thicknesses and different doping levels from each other.

25. (Previously Presented) The laser according to claim 18, wherein each of said plurality of n-doped mirror semiconductor layers has different thicknesses and different doping levels from each other.

26. (Previously Presented) The vertical cavity surface emitting laser according to claim 19, wherein each of said plurality of doped $Al_xGa_{1-x}As$ layers has different thicknesses, different doping levels and different compositions from each other.